

To enter a reference to an entire row or column, use the row number or column letter as both halves of the range reference: B:B for column B, 2:2 for row 2. You can also use this syntax for multiple rows or columns—B:K includes every cell in columns B through K, just as 10:13 includes every cell in rows 10 through 13.

ABSOLUTE VERSUS RELATIVE CELL REFERENCES

Normally, Excel interprets cell and range references within a formula as *relative references*. When you copy or move the formula, Excel automatically adjusts cell references to reflect their position relative to the new location. This capability is useful when you need to quickly copy a formula across several rows or columns. In the worksheet shown in Figure 20.1, for example, the formula in cell D13 totals the contents of D7 through D12. When you copy that formula across to the right, Excel assumes you want to total the numbers in the same relative position in each column, so it adjusts the formula accordingly, from =SUM(D7:D12) to =SUM(E7:E12), =SUM(F7:F12), and so on.

Figure 20.1
Relative cell addresses are automatically updated as they are copied from cell to cell.

B7 =SUM(B2:B6)						
	A	B	C	D	E	F
1	Year	North	South	East	West	Grand Total
2	2011	5,630	5,880	6,600	4,760	22,870
3	2012	6,120	4,810	6,610	6,790	24,330
4	2013	3,650	5,520	5,870	3,360	18,400
5	2014	6,590	6,470	5,120	4,660	22,840
6	2015	5,600	6,530	4,830	4,180	21,140
7	Total	27,590	29,210	29,030	23,750	109,580

→ The easiest way to copy a row or column of formulas is with the help of Excel's AutoFill feature; see "Automatically Filling In a Series of Data," p. 519.

In some cases, however, you want to copy a formula so that a cell or range reference in the copied formula points to the same cell or range as in the original. For example, if you enter the current interest rate in a cell near the top of a loan worksheet, you can refer to that cell in any formula that makes an interest-related calculation. To convert a relative reference to an *absolute reference*, which does not adjust when copied or moved, use dollar signs within the cell address. For example, when you copy the formula =B4*\$A\$5 to the right, Excel adjusts the first cell reference relative to its new location, but leaves the second reference unchanged: =B5*\$A\$5, =B6*\$A\$5, and so on.

TIP FROM

EQ & Woody

When you want to include a reference to an input cell in several formulas, you're generally better off using a named range, which is always an absolute reference. If cell A5 contains an interest rate, name the cell Interest_Rate and use that name in formulas—=B6*Interest_Rate, for example. If you move or copy the formula, the reference to the named range will not change.

You can mix and match relative and absolute addresses in a formula, or even in the same address. Using a dollar sign in front of the column portion of the address (\$A5) tells Excel to change only the row reference when the formula is moved or copied; likewise, a dollar

sign in front of the row (A\$5) changes only the column portion of the cell reference. In Figure 20.2, for example, you could enter the formula `=B2/$F2` in cell B10 and then copy the formula down and to the right. The *mixed reference* to \$F2 adjusts the references so that they always point to the Grand Total formula in Column F for the correct row.

Figure 20.2

Formulas in the bottom table use mixed references; that allows each percentage to be divided by the result in the Grand Total column as you copy the formula down and across.

	A	B	C	D	E	F
1	Year	North	South	East	West	Grand Total
2	2011	5,630	5,880	6,600	4,760	22,870
3	2010	5,120	4,810	6,610	6,790	24,330
4	2009	3,650	5,520	5,870	3,360	18,400
5	2008	6,590	6,470	5,120	4,660	22,840
6	2007	5,600	6,530	4,830	4,180	21,140
7	Total	27,590	29,210	29,030	23,750	109,580
8						
9	Year	North	South	East	West	
10	2011	24.6%	25.7%	28.9%	20.8%	
11	2010	25.2%	19.8%	27.2%	27.9%	
12	2009	19.8%	30.0%	31.9%	18.3%	
13	2008	28.9%	28.3%	22.4%	20.4%	
14	2007	26.5%	30.9%	22.8%	19.8%	

Use the F4 keyboard shortcut to switch quickly between relative, mixed, and absolute references in a formula. Click in the active cell to enable editing; then place the insertion point in a cell or range reference (either in the Formula bar or in the cell itself) and press F4 to convert a relative reference to absolute. Press F4 again to enter a mixed reference. Keep pressing F4 to cycle through all four variations for the selection.

TIP FROM

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NEW

In Excel 2007, point to the bottom edge of the Formula bar and your mouse pointer changes to a double-headed arrow. Drag the edge down to increase the size of the Formula bar. By expanding the Formula bar to multiple rows, you can easily see the complete formula for those cells that hold extra-long formulas.

USING 3D REFERENCES TO CELLS ON OTHER WORKSHEETS

Sometimes it's helpful to use references to cells and ranges on other worksheets within the same workbook—known as *3D references*. For example, you might include a lookup table that lists sales tax rates for different counties or states on a separate sheet. Using this table to determine the correct tax rate for an invoice makes your data accurate, yet keeps the invoice sheet uncluttered. Likewise, in a loan worksheet, you might want to perform all the data-entry and payment calculations on one sheet, but place the amortization table on its own sheet for display and printing.

To enter a 3D address, preface the cell address with the name of the sheet followed by an exclamation point. (If the sheet name contains a space, enclose the sheet name within single quote marks.) If you have a sheet named *Amortization Table*, for example, you can refer to the top-left cell of that sheet by entering `'Amortization Table'!A1` on any other sheet in the same book. You can also click the appropriate sheet tab and then select the desired cell or range of cells to add references to cells or ranges on other sheets. When you use this technique, Excel automatically enters the sheet name, exclamation point, and cell references.